

## **ABSTRACT OF THE DISCLOSURE**

Systems and methods are described for long subscriber loops using automatic gain control. A method includes extending a digital subscriber loop including: producing an output signal from said first variable gain amplifier responsive to an input signal from said digital  
5 subscriber loop; monitoring a signal strength of said output signal; generating a gain control signal responsive to said signal strength; and controlling a gain of said variable gain amplifier responsive to said gain control signal. An apparatus includes a digital subscriber loop extender circuit including: a variable gain amplifier having a gain and providing an output signal in  
10 response to an input signal from a signal generator over a transmission medium, said output signal having a signal strength as a function of said gain; and a controller coupled to said variable gain amplifier, said controller generating a gain control signal that is feed back to said variable gain amplifier to automatically control said gain.